

Hayashi et al. U.S. Patent No. 4,528,340. Applicants respectfully traverse the rejections.

In the outstanding Office Action, the Examiner states,

It would have been obvious to deproteinize rubber before grafting and/or epoxidation in the expectation of reducing allergens and enhancing the physical and mechanical properties for the same class of rubbers used by Kondo or Hayashi or Burlett.

Applicants find the Examiner's position untenable for the following reasons.

With regard to the Examiner's allegation that the artisan would have the expectation of reducing allergens, Yasuyuki et al teach that there would be a reduction in the allergens of the deproteinized natural rubber. There is no teaching or suggestion that allergens are a problem with epoxidized rubber and/or grafted rubber, and as such the skilled artisan would not be motivated to use the rubbers of Yasuyuki et al based upon this teaching that the deproteinized natural rubbers have reduced allergens.

With regard to the Examiner's allegation that the artisan would be motivated to use the deproteinized rubbers of Yasuyuki et al to enhance the physical and mechanical properties of the same class of rubbers used by Kondo or Hayashi or Burlett, Applicants respectfully submit that the artisan is well aware that the physical and mechanical properties of polymeric starting materials would be unequivocally altered during the

epoxidation/grafting processes. As such, the artisan would not have a reasonable expectation that the advantageous physical and mechanical properties of the deproteinized rubber starting materials, would automatically be engendered in the epoxidized rubber and/or grafted rubber.

The Examiner alleges that the unexpected results do not outweigh the expected results. In response to this assertion, a Declaration under 37 CFR 1.132 by Mr. Miyamoto has been prepared (to be filed in the near future).

In the Declaration, Mr. Miyamoto attests that the present invention relates to either grafting at a high efficiency or epoxidizing at a high epoxidation ratio of rubber which has been modified by extracting the naturally occurring proteins. In his opinion, the problem with grafting the natural (non-modified) rubbers is that the proteins, naturally occurring in the rubber, adversely affect the grafting and epoxidation process, thereby reducing the efficiency.

Upon review of Tables 1-3 on pages 20, 22 and 25 of the specification, it is clear to Mr. Miyamoto that as the protein content decreases, the graft ratio increases, i.e., the percent of the monomers which are grafted to the main chain backbone of the rubber polymer increases. Likewise, the epoxidation ratio increases as the protein content decreases, as shown in Table 2.

In Mr. Miyamoto's opinion, this is a result of the fact that the naturally occurring protein in the rubber molecules sterically hinder the reacting reagent from contacting the rubber. Additionally the naturally occurring proteins act as a substrate for the reacting reagent thereby decreasing the concentration and the reaction speed.

In Mr. Miyamoto's opinion, since there is no teaching or suggestion by any of the cited references that proteins found in natural rubber reduce the efficiency of either the grafting or the epoxidizing of the rubber, then it logically follows that none of the cited references teach the unexpected advantages effected by deproteinizing the natural rubber prior to grafting or epoxidizing. In other words, the efficiency of either the grafting or the epoxidizing of the rubber has increased to such an extent as to be unexpected by removing the naturally occurring proteins.

In conclusion, based upon Mr. Miyamoto's experience in the area of materials, he is of the opinion that the results provided in the present specification are unexpected. Thus, the Examiner is invited to review the cited references and the comparative testing already of record again in view of Mr. Miyamoto's opinion. Applicants respectfully submit that the scales have tipped even further in the direction of nonobviousness. Withdrawal of the rejection is respectfully requested.

Conclusi n

In view of the above amendments and comments, Applicants respectfully submit that the application is in condition for allowance. A Notice to such effect is earnestly solicited.

Should the Examiner wish to discuss any issues concerning this application, he is requested to telephone the undersigned at (703) 205-8000 in the Washington, D.C. area.

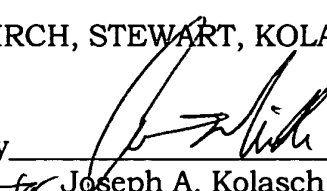
Pursuant to the provisions of 37 C.F.R. §§ 1.17 and 1.136(a), the Applicants hereby petition for an extension of three (3) months to September 16, 1999 in which to file a reply to the Office Action. A check for the amount of \$870.00 is enclosed.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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